

Laboratory Training and



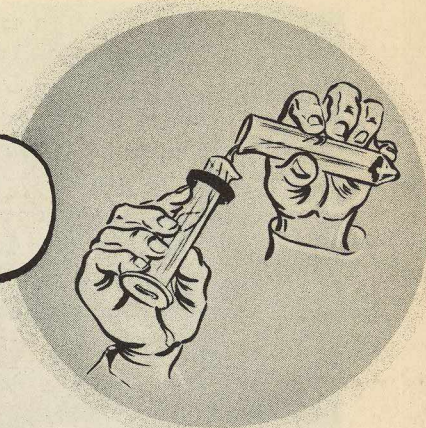
The lack of trained laboratory personnel capable of identifying parasitic organisms was recognized as a serious handicap during World War II. Health authorities were concerned by the many servicemen returning home with both recognized and hidden parasitic infections.

The Communicable Disease Center was charged with the responsibility of providing facilities for training of laboratory personnel to correct this deficiency. Laboratories were built and equipped, a staff was assembled, and the first 6-week course in the "Laboratory Diagnosis of Parasitic Diseases" was given in October 1945.

A policy was established whereby students are selected only from already employed laboratory personnel, first consideration being given to employees of State and local public health laboratories and Federal agencies. This policy is intended to improve proficiency in the performance of daily work and to train students in the use of improved and newly developed techniques, rather than to replace the basic training for laboratory workers which is

Extension Service Programs

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provided in schools and colleges.

A feature of the training offered is the degree of individual instruction made possible by a high instructor-student ratio. Improved proficiency in identification is obtained through repeated examinations of unknown specimens. Both fresh and preserved materials are in plentiful supply, and materials not readily available in this country are imported from tropical regions. A member of the Laboratory Division staff is stationed at the School of Tropical Medicine in Puerto Rico for the purpose of collecting such materials.

Fortunately, the fear that there might be a major extension of imported parasitic infections to the civilian population proved to be unfounded. The great majority of imported parasitic infections are encountered in the Veterans Administration Hospitals at the present time. In 1947 an agreement was made with the Veterans Administration to accept one student from each of the 13 VA districts throughout the country for refresher training in each of the parasitology courses.

Twelve 6-week courses in the "Laboratory Diagnosis of Parasitic Diseases" have been given to date. Refresher training has been provided for approximately 250 laboratory workers from 44 States, 2 Territories, and 5 foreign countries. About 40 percent of the students came from State and local public health laboratories; 40 percent came from Veterans Administration Hospital laboratories; and 20 percent came from general hospital

laboratories, the Public Health Service, and foreign countries.

The success of the training courses in parasitology, in addition to fulfilling the original purpose, led to an opportunity to extend the scope of the program to improve laboratory diagnosis in the other fields of medicine. As the various branches of the Laboratory Division were organized and the methodology research programs developed, training courses were established to provide refresher training in their respective fields. Thus, 4-week courses in the "Laboratory Diagnosis of Tuberculosis" and in the "Laboratory Diagnosis of Mycotic Diseases" were given for the first time in 1948.

The scheduled laboratory training program in 1949 consists of 14 courses in eight subjects as refresher training for laboratory personnel. In addition, two courses of 2 weeks' duration and two courses of 1 week's duration are being given for laboratory directors—courses designed to acquaint them with the material that is taught to their technicians in the longer courses.

A brief description of each of the courses now being offered follows:

1. A 6-week course in the "Laboratory Diagnosis of Parasitic Diseases" includes laboratory diagnosis of diseases due to intestinal parasites, with special emphasis on amebiasis, hookworm disease, echinococcosis and schistosomiasis, and diagnosis of all the blood parasites. Some consideration is given in this course to arthropods of medical

importance.

2. A 2-week course in the "Laboratory Diagnosis of Parasitic Diseases," designed for laboratory directors, senior laboratory staff members, physicians, and others of comparable professional standing, includes the same subject material as that listed in course No. 1 above, but less emphasis is placed on improving performance of techniques and on drilling with unknown specimens.

3. A 4-week course in the "Laboratory Diagnosis of Mycotic Diseases" covers identification of common saprophytic fungi and methods of cultivating and identifying the dermatophytes and the fungi causing subcutaneous and systemic infections, represented by organisms such as *Trichophyton*, *Sporotrichum*, *Coccidioides*, and *Histoplasma*.

4. A 1-week course in the "Laboratory Diagnosis of Mycotic Diseases" for laboratory directors and supervisory personnel, which includes the same subject material as that listed in course No. 3 with less emphasis on improving technical proficiency.

5. A 4-week course in the "Laboratory Diagnosis of Bacterial Diseases (Part I. Tuberculosis Bacteriology)," which covers such topics as preparation of culture media, microscopic techniques, methods for cultivating acidfast organisms from pathological material, and of diagnosis by animal inoculation.

6. A 1-week course in the "Laboratory Diagnosis of Tuberculosis" for laboratory directors and supervisory personnel, covers the subject material of course No. 5, with greater emphasis on discussion groups and demonstrations and less on technical proficiency and unknown specimens.

7. A 4-week course in the "Laboratory Diagnosis of Bacterial Diseases (Part 2. General Bacteriology)," which covers the diagnosis of spirochetal infections, streptococcal and pneumococcal infections (with exercises in serological-type determination) and brucellosis in the first 2 weeks. The last 2 weeks deal especially with accepted methods for the diagnosis of infections due to *Hemophilus* species, the *Neisseria* and the *Corynebacteria*.

8. A 4-week course in the "Laboratory Diagnosis of Bacterial Diseases (Part 3. Enteric Bacteriology)," covers the bacterial infections (salmonellosis and shigellosis), including methods for isolation, biochemical identification, and serological and bacteriophage typing.

9. A 1-week course in the "Serological Diagnosis of Rickettsial Diseases" includes practice in all details of complement fixation and the Weil-Felix test.

10. A 2-week course in the "Laboratory Diagnosis of Bacterial Diseases" for laboratory directors and supervisory personnel, covers the subject material of courses Nos. 7, 8, and 9, with less emphasis placed on improving technical proficiency.

11. A 1-week course in the "Laboratory Diagnosis of Rabies" includes techniques for gross brain dissection, mouse inoculation, smears, and staining.

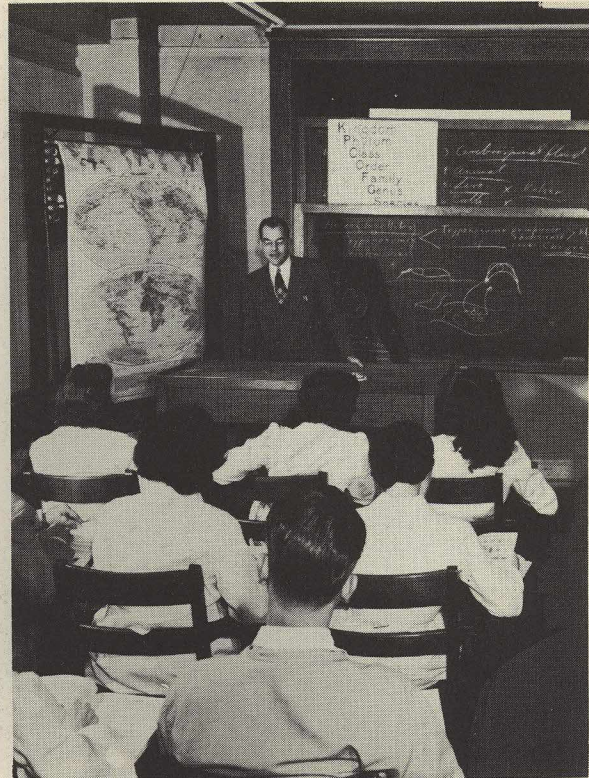
12. A 2-week course in the "Laboratory Diagnosis of Influenza" includes training in techniques of hemagglutination



Discussion session in conference room. Instructor explaining a diagnostic technique.



Part of a Laboratory Section in a course in Diagnosis of Bacterial Diseases.



Lecturing to students attending course in Laboratory Diagnosis of Parasitic Diseases.

tests and virus isolation by fertile egg and animal inoculation.

The preceding courses are scheduled during 1949 as follows:

1. Laboratory Diagnosis of Parasitic Diseases (6 wks.)
Mar. 14 to Apr. 22
Sept. 12 to Oct. 21
2. Laboratory Diagnosis of Parasitic Diseases (2 wks.)
June 20 to July 1
3. Laboratory Diagnosis of Mycotic Diseases (4 wks.)
Aug. 1 to Aug. 26
4. Laboratory Diagnosis of Mycotic Diseases (1 wk.)
June 6 to June 10.
5. Laboratory Diagnosis of Bacterial Diseases (Part 1. Tuberculosis Bacteriology) (4 wks.)
Feb. 28 to Mar. 25
Aug. 29 to Sept. 23
6. Laboratory Diagnosis of Tuberculosis (1 wk.)
June 13 to June 17
7. Laboratory Diagnosis of Bacterial Diseases (Part 2. General Bacteriology) (4 wks.)
Mar. 28 to Apr. 22
Sept. 26 to Oct. 21
8. Laboratory Diagnosis of Bacterial Diseases (Part 3. Enteric Bacteriology) (4 wks.)
Apr. 25 to May 20
Oct. 24 to Nov. 18
9. Serological Diagnosis of Rickettsial Diseases (1 wk.)
Feb. 21 to Feb. 26
July 25 to July 30
10. Laboratory Diagnosis of Bacterial Diseases (2 wks.)
May 23 to June 3

11. Laboratory Diagnosis of Rabies (1 wk.)
 Apr. 25 to Apr. 29
 Oct. 24 to Oct. 28
12. Laboratory Diagnosis of Influenza
 (2 wks.)
 Mar. 14 to Mar. 25

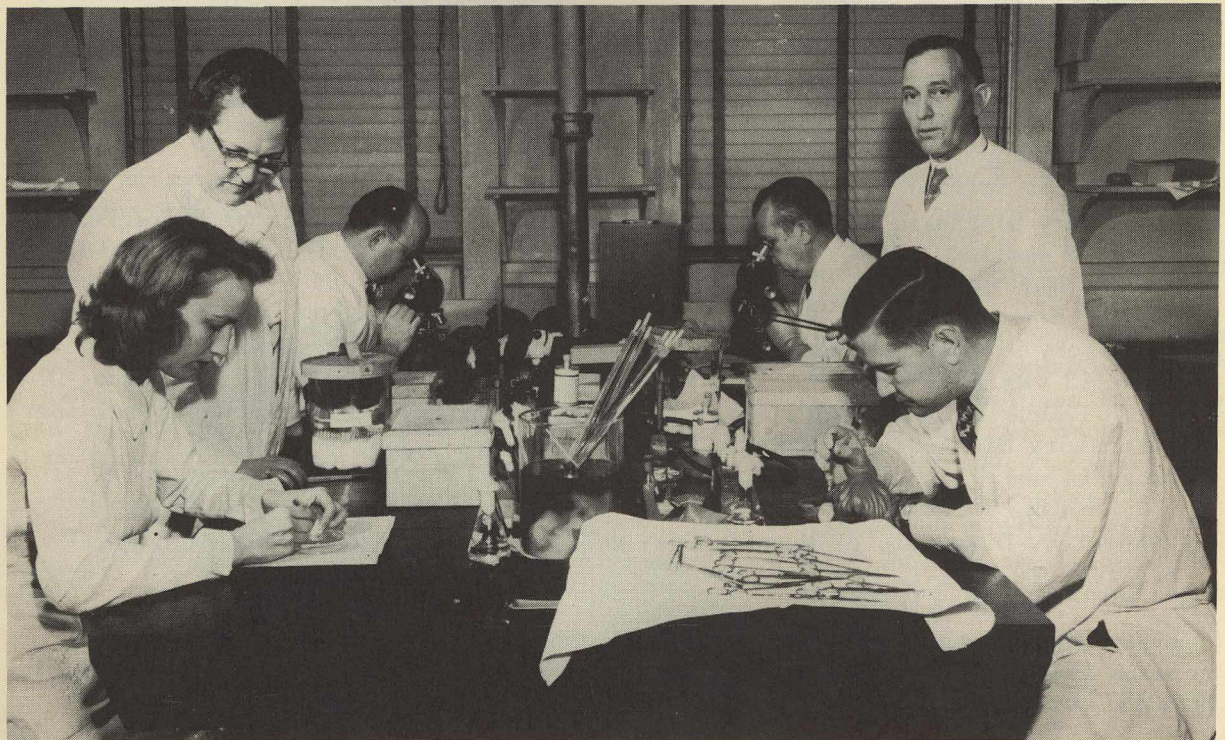
The necessity for restricting the size of classes to 20 students in each of the various training courses, dictated by the number of instructors and available space and materials, limits the number of laboratory personnel who can be trained each year to a small proportion of those who are employed in laboratories. This proportion is further reduced by the loss of trained personnel. It is obviously impossible to provide this training to the great majority of laboratory workers. Selection of students is, therefore, influenced by the education, training, position, and organization in which the applicant is employed. Preference is given to applicants from laboratories located in geographical areas where the subject

matter is of regional importance, or where there is a marked deficiency of such laboratory services available. Preference is also given to persons in positions that will enable them to institute the improved methods in their own laboratories, and to transmit their training to their coworkers and those in neighboring laboratories by means of intrastate training programs.

To assist most advantageously in the selection of trainees, it is required that applicants be nominated by the State health officer and/or the State laboratory director. Certainly, the State health authorities are in the best position to know where the needs are greatest in their State.

An Extension Service was developed in 1945 to supplement the number of laboratory people who could be trained in courses each year, and to provide former students with refresher training. The Extension Service mails two specimens each month,

Inoculating mice for diagnosis of rabies.



consisting of well-prepared stained and unstained slides, preserved and fresh materials, and various arthropods of medical importance. Much of the especially collected and prepared study material would not ordinarily be available to most laboratories in this country. A key is sent with each set of specimens which identifies the specimen and gives pertinent information about the staining, preservation, and stages of organisms present in the material.

The materials remain the property of each laboratory to which they are sent. Thus a valuable collection is being built up to serve a number of purposes. The specimens and instruction keys can be used as refresher material for the former students, and as training material for new laboratory workers. They can also be used to test the diagnostic proficiency of employed workers and as reference material to compare with unusual specimens sent in for reference diagnosis. Finally, they are valuable as demonstration material at meetings and conferences.

The shipments up to the present have consisted of parasitological and entomological specimens, and are sent to more than 310 laboratories located in every State and Territory. It is estimated that more than 2,000 laboratory workers have an opportunity to study this material each month. We are thus able to reach a much larger group than is possible through the training courses themselves.

Plans are now under way to develop similar extension services in the other fields of laboratory diagnosis, and we expect to start shipping mycological, acidfast, rabies, diptheria, *Salmonella*, and *Shigella* specimens this year. It is also planned to send other types of training aids consisting of filmstrips, photographs, charts,



Preparation Laboratory Unit — Preparing specimens for extension service.

and keys of various kinds.

A small number of special loan sets have been made up to meet particular needs. These are available upon special request for periods of 1 or 2 months, as needed.

Extension Service materials also have been used by State health departments in evaluation programs to determine the proficiency of local laboratories.

The plans for the future are to continue to develop courses and other refresher training aids in the entire field of laboratory diagnostic medicine, so that the best possible laboratory services will be available to the people throughout the entire country.